1995

Master of Science Degree Programs Computer Information Systems

Nova Southeastern University

NOVA SOUTHEASTERN UNIVERSITY

The School of Computer and Information Sciences

Master of Science Degree Programs

Computer Information Systems

Management Information Systems

The School of Computer and Information Sciences (SCIS)
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In Brief: The School of Computer and Information Sciences and Nova Southeastern University

The School of Computer and Information Sciences (SCIS) at Nova Southeastern University (NSU) offers programs leading to the degree of master of science in computer information systems, computer science, computing technology in education, and management information systems. At the doctoral level, programs are offered leading to the Ph.D. in computer information systems, computer science, information systems, and information science, and the Ph.D. or Ed.D. in computing technology in education. Combined master's-doctoral degree programs are available. Also available is a certificate program in information resources management leading to the M.S. as well as courses approved for Florida teacher certification in computer science or for recertification.

SCIS is dedicated to offering rigorous programs that are timely yet provide the student with an enduring foundation for future professional growth. The School has become a major force in educational innovation. It is distinguished by its ability to offer both traditional and nontraditional choices in educational programs and formats that enable professionals to pursue advanced degrees without career interruption. The School, which has over 700 graduate students from across the U.S. and other countries, has been awarding graduate degrees since 1984.

Originally *Nova University*, NSU is the 47th largest independent academic institution in the United States and the largest in Florida. NSU has a 250-acre campus in Fort Lauderdale, Florida with over 10,000 students on campus and 4,000 students in programs elsewhere in Florida, in 24 other states, and in several foreign countries. In addition to the School of Computer and Information Sciences, the University has an undergraduate college and graduate schools of law, medicine, clinical psychology, education, business, oceanography, social and systemic studies, humanities and arts, and hospitality. In addition, NSU's University School, a demonstration school, serves children from preschool through high school. Since 1971, NSU has enjoyed full accreditation by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS), which is recognized by the U.S. Department of Education as the regional accrediting body for this region of the United States. Currently there are more than 36,000 Nova graduates who work and contribute with distinction to their businesses and professions worldwide.

In addition to a significant number of traditional on-campus programs, NSU champions and practices distance education – a concept that enables professionals to earn master's or doctoral degrees without interrupting their careers. The concept is realized through a variety of approaches such as cluster, institute, and online programs.

Cluster programs are weekend programs that are offered on campus, at numerous locations in the United States, and at foreign sites. NSU is licensed by 24 states to conduct clusters, the reviews for which, in many cases, are comparable to acccreditation reviews. Nova has been offering this form of graduate education for over 20 years. While academic clusters are nontraditional in format, many courses retain traditional, small-class, professor/student interaction components.

The School of Computer and Information Sciences offers master's degree programs on campus in the evening, in cluster format, and online format. Doctoral programs are offered in on-campus cluster format and in a combined institute and online format.

NSU's master's degree programs require 36 or more credits of coursework (thesis optional) for graduation. The doctoral programs require 60 or more credits beyond the master's degree for graduation. Credit is not awarded for life-experience.

Each full-time faculty member teaching at the graduate level has an earned doctorate in the appropriate teaching field from an accredited institution.

The success of NSU's programs is reflected in the accomplishments of its graduates among whom are:

- 37 college presidents and chancellors
- 100 college vice presidents, provosts, deans, and department chairs
- a former state commissioner of education
- 65 school superintendents in 16 states including nine of the nation's largest school districts
- hundreds of college and university faculty members nationwide
- over 100 high-ranking U.S. military officers, including admirals and generals; business presidents, vice presidents, executives, middle managers, and researchers from companies such as American Express, Ameri-First Bank, AT&T, Bellcore, General Electric, GTE, Harris Corporation, IBM, Lenox China, Motorola, Racal Datacom, Southern Bell, Westinghouse, and William Penn Bank

Degrees and Programs of The School of Computer and Information Sciences

Master of Science (M.S.)

Computer Information Systems
Computer Science
Computing Technology in Education
Management Information Systems

Doctor of Philosophy (Ph.D.)

Computer Information Systems
Computer Science
Computing Technology in Education
Information Science
Information Systems

Doctor of Education (Ed.D.)

Computing Technology in Education

Graduate Certificate Program in Information Resources Management (IRM)

Florida Teacher Certification/Recertification Courses in Computer Science

Application for Admission

Applications should be submitted at least three months before the anticipated starting term. Students who wish to matriculate in a shorter amount of time must contact the SCIS admissions office by telephone to begin the process. Copies of transcripts are acceptable for unofficial early review. Students applying late may be granted provisional acceptance pending completion of the application process. To obtain information or application forms, contact:

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Admission requirements are described in the individual program sections of this brochure.

Provisional or Conditional Admission

A degree-seeking applicant who has missing documents but appears to be acceptable based on documents received by SCIS may be offered *provisional admission* pending the receipt and acceptability of the remaining required documents. Examples of missing documents are an official transcript and a letter of recommendation. An applicant who has not met all admission requirements may be given *conditional admission* if sufficient evidence exists to suggest the ability to perform successfully at the graduate level. A student with *conditional* status must remove stated deficiencies before advancement to degree status.

Term Dates

Terms in the master's program are 12 weeks in duration. There are four terms per year. Terms start in September, January, April, and July.

Transfer Policy

Up to six graduate credits may be transferred from a regionally accredited institution. Courses proposed for transfer must have received grades of at least "B". Students must request approval of transfer credits in writing at the time of application.

Orientation and Advisement Program

New students attend an orientation weekend on the campus in Ft. Lauderdale which includes an introduction to the program office staff and faculty, instruction in online computer requirements and connections, and training in the use of UNIX and the Internet. The orientation also includes library services (campus and online) and a tour of the campus. Advisement is conducted regularly by the student's program office with the assistance of the faculty.

Thesis Option

The two options leading to the master's degree are the thesis option and the non-thesis option. For the thesis option, 30 semester hours of course work and six semester hours for the thesis are required. For the non-thesis option, 36 semester hours of course work are required.

Combined Master's and Doctoral Degree Option

This option provides the opportunity to earn the Ph.D. in a shorter time. Students must first be accepted in the master's program. Once eight courses (24 credits) are completed in the master's program with a GPA of at least 3.25, the student may apply for acceptance into a doctoral program. If accepted, after completing 12 credits in the doctoral program, the student is awarded the master of science degree. These credits also count toward the Ph.D.

Financial Aid

The Office of Student Financial Aid administers the University's financial aid programs of grants, loans, scholarships, and student employment, and provides professional financial advisors to help students plan for the most efficient use of their financial resources for education. Underlying the awarding of financial assistance is the philosophy that students have a responsibility for contributing from earnings and savings toward their education. Financial aid resources serve to supplement the student's financial resources.

In order to qualify for financial aid, a student must be admitted into a University program, must be a U.S. citizen or a U.S. immigrant, and must plan on registering for a minimum of six credit hours per term. **A prospective student who requires financial assistance should apply for financial aid while a candidate for admission.** To continue financial aid, at a minimum, enrolled students must demonstrate satisfactory academic progress toward a stated educational objective in accordance with the University's policy on satisfactory progress for financial aid recipients. For financial aid information or application forms, call (305) 452-3380 or (800) 522-3243.

Tuition Payment Policy

Options available for payment of tuition are: full payment by student, installment payment by student, direct payment by student's employer, tuition reimbursement by employer, or financial aid award.

1. *Full Payment by the Student.* Full payment of tuition and fees is to be made at the time of registration. Registration after the registration period, when permitted, will involve payment of a late registration fee.

2. *Installment Payment by the Student.* The student may elect an installment payment plan which requires three payments spread over the first 90 days of the term. The first payment, due at registration, includes all fees, 50% of the tuition, plus a $50 deferment fee. The second payment, due sixty days from the beginning

of the term, shall equal 25% of the tuition. The third payment, due ninety days from the beginning of the term, shall equal 25% of the tuition. The first payment must be made by check, money order, or credit card. At the time of registration, the student must submit post-dated checks or credit card authorizations for the second and third installments.

3. *Direct Payment by the Student's Employer.* If a letter of commitment, or a voucher from the student's employer accompanies the registration form, then the student will not be required to make a payment at registration time. The letter of commitment, or the voucher, must indicate that the employer will remit full payment of tuition and fees to Nova Southeastern University upon receipt of the invoice from the University's Accounts Receivable Office.

4. *Tuition Reimbursement by the Student's Employer.* If the student submits a letter from the employer at registration time that establishes eligibility for tuition reimbursement, the student may choose a two-payment plan. The first payment, due at registration, shall include all fees, 50% of the tuition, plus a $50 deferment fee. The second payment, due five weeks after the end of the term, shall equal 50% of the tuition. To secure this plan, the student must provide, at registration, a post-dated check or credit card authorization for the deferred portion.

5. *Financial Aid Award.* If a student has received an official financial aid award letter and all documents have been completed, then the student may register without payment. If a student's application for financial aid is still being processed at the time of registration, then the student must register using the installment payment plan described in 2. above.

Tuition and fees may be satisfied with payment by check, money order, credit card, or official financial aid award letter with associated financial aid documentation. No cash will be accepted as payment for tuition and fees unless paid at the Registrar's office on the main campus. All post-dated checks or credit card authorizations will be held by the University for processing until the due date specified in this policy.

This policy is subject to change at any time at the discretion of the administration of Nova Southeastern University.

Grade Requirements and Time Limitations

Students must maintain a cumulative grade point average of at least 3.0 for the duration of their master's degree program. Students in a master's degree program are expected to complete requirements for the degree within five years from the date of their first registration.

Online Computing Resources

SCIS students are given computer accounts and are encouraged to use NSU's computing resources. The wealth of information and tools available online greatly enhance the learning process. Students may gain access to these resources from computers in laboratories on the campus, and also from locations distant to the campus such as homes and offices using either an IBM-compatible PC or an Apple/Macintosh computer and a modem. Students must have remote access from home or office in order to participate in the School's programs. All students will be given training and counseling on computer requirements and online access.

Several of the School's academic programs have online components. An online component may include a range of activities that facilitate frequent interaction with faculty, classmates, and colleagues. In such cases, online interactive learning methods and teleconferencing are used throughout the instructional sequence. These include NSU's real-time electronic classroom sessions, electronic submission of assignments, electronic mail communications, interactive bulletin boards, and the electronic library. Learning and interaction are facilitated by hypertext menuing systems. The Internet is used extensively.

Students in the local Fort Lauderdale area are encouraged to access the host computer by direct dial. Students away from the local Fort Lauderdale area can avoid a long-distance telephone charge by using the AT&T data communication network.

There are no specific limits to online time for SCIS students, however, students are encouraged to use their online time wisely in order to conserve resources. Online time that has been excessive and/or used for purposes other than those directly related to academics can result in a charge to the student of $15 US per hour. Students are notified before a charge for excessive hours is levied. Students must be registered in order to use the University's computing facilities.

Library Services

The Einstein Library, on the main campus, houses the University's major collection of books and journals in the humanities and sciences. The library can be searched through the computer catalog which is considerably more sophisticated than the traditional card catalog. Also, more than 25 specialized indexes in CD-ROM format are available as well as dial-up access to the online catalog. The library is a member of SEFLIN and FLIN, cooperative library networks that speed access to materials from other institutions throughout Florida. The Einstein Library has also been named a cooperating library of the Foundation Center in New York, giving students access to a special collection for grants and foundation research.

NSU's Distance Library Services (DLS) department provides off-campus students with most of the library services available to on-campus students. Students may order books and reprints of papers, search catalogs, search indexes, and speak directly with a reference librarian. DLS can be accessed in many different ways. Materials may be ordered by e-mail, toll-free telephone, FAX, or regular mail. A voice mail answering machine is available 24 hours a day to take requests when the office is closed. Many services may be obtained by accessing the DLS's online Electronic Library including access to the library's catalog and periodical holdings, holdings of other libraries, and online databases/information services. The online student will be able to request materials and gain access to a librarian. DLS provides students with books and photocopies of periodical articles via U.S. mail. All materials mailed by DLS are sent by first-class mail. When books are borrowed, the student will have to pay a small charge for third-class postage to return the books. Books are loaned for one month. Periodical copies or ERIC documents need not be returned.

Also, for distance students, the University has made possible the use of many local libraries. The SCIS Admissions Office provides information to new students about libraries in their geographical area that are included in this arrangement and the procedures to follow.

Additional Information

For additional information on programs and policies, consult the 1995-1996 SCIS Graduate Catalog.

Master of Science in Computer Information Systems

This program offers a course of study leading to the Master of Science (M.S.) in Computer Information Systems. It is designed to give students a thorough knowledge of the field and to provide an enduring foundation for future professional growth. The program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. Its formats offer professionals the opportunity to earn the master's degree in 18 months while continuing to work in their current positions. The curriculum is consistent with recommendations for a model curriculum in computer information systems as outlined by the Association of Computing Machinery (ACM).

Admission Requirements

Applicants must meet the specified minimum requirements and file the requested documents:

1. An earned bachelor's degree from a regionally accredited college or university. The program is designed for students with undergraduate majors in computer science, computer information systems, engineering, mathematics, or physics. Applicants must have knowledge of data structures, computer hardware and architecture, structured programming, college algebra, and discrete mathematics.
2. Official transcripts of all graduate and undergraduate education showing an undergraduate G.P.A. of at least 2.5 and a G.P.A. of 3.0 in a major field.
3. A completed application and application fee.
4. Three letters of recommendation.
5. Score report of the Graduate Record Examination (G.R.E.) or a comprehensive portfolio of appropriate professional experience and credentials.

Program Formats

The 36-semester-hour program, consisting of 12 courses, is designed so that it may be completed in 18 months without interrupting the student's professional career. The program can be taken in the evening on the main campus, online, or on weekends at several Florida locations. With permission of the program office, a student in one format may take a course in another format.To complete the program in 18 months, students must enroll in two courses per term. Terms are 12 weeks in duration, and four terms are offered each year. Terms start in September, January, April, and July.

A student wishing to take a course as an independent study must first appeal to the program office. If the program office agrees, then it will attempt to obtain the agreement of a faculty member to direct the independent study and will then inform the student of its decision. A student wishing to cross-register for a course in another SCIS master's degree curriculum must obtain the approval of his or her program office.

Formats for this program are described below:

On-Campus Format

This format consists of 8 core courses and 4 electives. Each three-credit course meets three hours per week for 12 weeks. Courses are held on campus in the evening.

Online Format

This format requires the completion of 12 courses via online techniques. It involves participation in a range of activities that facilitate frequent interaction with faculty, classmates, and colleagues including NSU's real-time electronic classroom sessions, online computer discussions and conferences, electronic submission of assignments for review by faculty, electronic mail, interactive bulletin boards, the electronic library and NSU's distance library services. Learning and interaction are facilitated by hypertext menuing systems. The Internet is also used extensively. Costs for online activities are included in the tuition.

Florida Cluster Format

This format is offered in Tampa, and may be available at other sites in Florida. Students attend three weekends per term per course. Weekend classes are held on Friday evening and all day Saturday. The program, consisting of 12 core courses, is designed to be completed in 18 months with students enrolling for two courses per term. Students are expected to maintain this course load.

The Curriculum for the M.S. In Computer Information Systems

Core courses for the on-campus format are listed below:

MCIS 610 Data and File Structures
MCIS 620 Computer Information Systems
MCIS 630 Database Systems
MCIS 640 System Test and Evaluation
MCIS 650 Data and Computer Communications I
MCIS 660 Systems Analysis and Design
MCIS 661 Object-Oriented Applications for CIS
MCIS 680 Human-Computer Interaction

Electives for the on-campus format are listed below. The student can select four of these courses. If the thesis option is elected, then only two of these courses will be required. Plans for the thesis option must be made with the program office.

MCIS 611 Survey of Programming Languages
MCIS 615 Computer Operating Systems
MCIS 621 Information Systems Project Management
MCIS 622 Office Automation Systems
MCIS 623 Legal and Ethical Aspects of Computing
MCIS 624 Computer Integrated Manufacturing
MCIS 625 Computer Graphics for Information Managers
MCIS 631 Database Systems Practicum
MCIS 632 Distributed Database Management Systems
MCIS 651 Data and Computer Communications II
MCIS 652 Computer Security
MCIS 654 Applications of the Internet
MCIS 670 Artificial Intelligence and Expert Systems
MCIS 671 Decision Support Systems
MCIS 672 Computer-Aided Software Engineering
MCIS 681 Multimedia and Emerging Technologies
MCIS 682 Information Systems Project
MCIS 683 Data Center Management
MCIS 691 Special Topics in Computer Information Systems

The 12 courses for the online format and cluster format are listed below. If the thesis option is elected, then two of these courses will not be required. Plans for the thesis option must be made with the program office.

MCIS 610 Data and File Structures
MCIS 615 Computer Operating Systems
MCIS 620 Computer Information Systems
MCIS 625 Computer Graphics for Information Managers
MCIS 630 Database Systems
MCIS 640 System Test and Evaluation
MCIS 650 Data and Computer Communications I
MCIS 660 Systems Analysis and Design
MCIS 661 Object-Oriented Applications for CIS
MCIS 670 Artificial Intelligence and Expert Systems
MCIS 671 Decision Support Systems
MCIS 680 Human-Computer Interaction

To ensure that students have an adequate background in mathematical methods and computer technology, the program requires the four graduate-level foundation courses listed below. Students who can demonstrate competence in these subject areas may request waiver of these courses.

MCIS 500 Assembly Language and Architecture
MCIS 501 C++ Programming Language
MCIS 502 Mathematics in Computing
MCIS 503 Data Structures and Algorithms for CIS

Course Descriptions for the M.S. in Computer Information Systems

MCIS 500 Assembly Language and Architecture (3 credits)
A comprehensive examination of the fundamental concepts and architectural structures of contemporary computers. Complex instruction set architectures (CISC) and reduced instruction set architectures (RISC) will be studied from programming and structural viewpoints.

MCIS 501 C++ Programming Language (3 credits)
An in-depth study of the C++ programming language. Principles of the object-oriented paradigm. Object-oriented programming theory and practice.

MCIS 502 Mathematics in Computing (3 credits)
Graph theory, lattices and boolean algebras, state models and abstract algebraic structures, logical systems, production systems, computability theory, recursive function theory.

MCIS 503 Data Structures and Algorithms for CIS (3 credits)
Sorting and searching, algorithms for tree structures, advanced data structures, graph algorithms, complexity, dynamic programming, optimization problems. Prerequisite: Ability to program in a high-level programming language.

MCIS 610 Data and File Structures (3 credits)
Data and file structure concepts, data record format and file organization, sequential vs. random file access methods, tree-based file structure and search techniques, indexing and data clustering, multiway sort/merge and sort algorithms, input/output blocking and buffering, and advanced secondary storage technology for multimedia binary large objects.

MCIS 611 Survey of Programming Languages (3 credits)
Organization and types of programming languages. Analysis of imperative, object-oriented, and declarative language paradigms. Higher-level languages. Comparative analysis of programming languages used in the development of computer information systems.

MCIS 615 Computer Operating Systems (3 credits)
Objectives of managing computer system resources. Memory management, process management, file system management, scheduling, synchronization, interrupt processing, distributed processing, and parallel systems. An analysis of the role of operating systems in computer information systems development, operation, and evolution.

MCIS 620 Computer Information Systems (3 credits)
Covers major concepts and architecture of computer information systems including information concepts; information flow; types of information systems; the role of information in planning operations, control, and decision-making; integrated information systems across a range of functional elements. Computer information systems in organizations.

MCIS 621 Information Systems Project Management (3 credits)
Life-cycle models/paradigms. Project planning and risk analysis. Project control including work breakdown structures, project scheduling, activities and milestones. Software cost estimation techniques/models. Software quality assurance and metrics for software productivity and quality. Inspections, walkthroughs, and reviews. Approaches to team organization. Configuration management. Automated project management tools. Software maintenance. Information system security. Procurement of software services and systems. Management of operational systems. Legal/ethical issues associated with CIS and software.

MCIS 622 Office Automation Systems (3 credits)
Focuses on strategies for utilizing technology to handle the information used in the office to improve the quantity, content, and format of work performed. Topics include the design and implementation of an office automation system; strategies for successful end-user computing; OA applications including electronic mail and voice mail; windowing; multitasking; computer conferencing; computer supported cooperative work; project management software; and decision support programs. The impact of ISDN on the office environment will also be examined.

MCIS 623 Legal and Ethical Aspects of Computing (3 credits)
Focuses on issues that involve computer impact on society and related concerns. Transitional data flow; copyright protection; information as a source of economic power; rights to access computer systems; computer crime; data privacy; establishing national priorities in the technical and social aspects of computing; current and anticipated uses of computer prediction; and protection of personal ethical concerns. National computer policies of Japan, France, Great Britain, and the European Economic Community. The status of regulation and emerging standards.

MCIS 624 Computer Integrated Manufacturing (3 credits)
Provides a framework for understanding how functional organization structure impacts the design of a management information system in a manufacturing setting. Special emphasis will be on marketing, manufacturing, and financial information systems. Topics covered include the product life cycle; production scheduling and capacity requirements planning; techniques for using MIS in inventory management decisions, quality control, internal accounting, and funds management. Planning strategies for forecasting services, developing requirements and specifications, writing requests for proposals, and project management will be examined within the context of functional information systems.

MCIS 625 Computer Graphics for Information Managers (3 credits)
Presents computer graphics as an aid to information managers who need a clear means of presenting the analysis of information. Topics include basic graphic techniques (e.g. histograms, bar charts, pie charts), the theory of graphic presentation of information, desktop publishing software, presentation software, graphics monitors (EGA, CGA, VGA, RGB, composite), laser printers, computer screen projection systems, and standards.

MCIS 630 Database Systems (3 credits)
Methodologies and principles of database analysis and design are presented. Conceptual modeling and specifications of databases, database design process and tools, functional analysis and methodologies for database design, entity-relationship model and advanced semantic modeling methods. Auxiliary concepts and theories of database systems including the architectures of database systems, logical and physical database organizations, data models for database systems (network, hierarchical, relational and object-oriented model), relational algebra and calculus, query languages, normal forms, null values and partial information, relational database design utilizing dependencies, view design and integration, concurrency control, query optimization, client/server database applications, distributed databases, object-oriented databases, and the current research and development trends of database analysis, design, modeling, and applications.

MCIS 631 Database Systems Practicum (3 credits)
The techniques of database management systems are applied to practical projects. Prerequisite: MCIS 630.

MCIS 632 Distributed Database Management Systems (3 credits)
Information storage and retrieval in a distributed environment. Distributed processing networks; degrees of distribution; approaches to distribution – multiple unduplicated/duplicated and centralization/decentralization issues; management concerns and criteria; and technical developments in office systems (digital voice communications, LANS, electronic mail, decision support systems, etc.). Alternatives to distributed processing. Prerequisite: MCIS 630

MCIS 640 System Test and Evaluation (3 credits)
An analysis of the verification and validation process. Methods, procedures, and techniques for integration and acceptance testing. Reliability measurement. Goals for testing. Testing in the small and testing in the large. Allocation of testing resources. When to stop testing. Test case design methods. Black box software testing techniques including equivalence partitioning, boundary-value analysis, cause-effect graphing, and error guessing. White box software testing techniques including statement coverage criterion, edge coverage criterion, condition coverage criterion, and path coverage criterion. Test of concurrent and real-time systems.

MCIS 650 Data and Computer Communications I (3 credits)
The fundamentals of data communications and data communication networking. Topics include data transmission and encoding, digital data communication techniques, data link control, multiplexing, switched communications networks, circuit-switched networks, packet-switching techniques and systems (ARPANET/DDN, TYMNET, SNA, X.25 standard), local area networks, metropolitan area networks, optical fiber bus and ring topologies, the Fiber Distributed Data Interface (FDDI) standard, and LAN/MAN standards such as IEEE 802.

MCIS 651 Data and Computer Communications II (3 credits)
Communications protocol concepts, the open systems interconnection (OSI) model, the TCP/IP protocol suite, systems network architecture (SNA), internetworking, transport protocols, ISO transport standards, XTP transfer protocol, OSI session services and protocol, presentation concepts, Abstract Syntax Notation One (ASN.1), encryption, virtual terminal protocols, distributed applications including network management (SNMPv2), file transfer (FTAM), and electronic mail (X.400). The integrated services digital network (ISDN) architecture and services, broadband ISDN, and the impact of frame relay and cell relay technologies on network design. Prerequisite: MCIS 650.

MCIS 652 Computer Security (3 credits)
Provides a foundation for understanding computer and communications security issues and a framework for creating and implementing a viable security program. Topics include hardware, software, and network security; the regulatory environment; personnel considerations; cryptography; protective controls against potential threats including hackers, disgruntled insiders, and software viruses; and techniques for responding to security breaches.

MCIS 654 Applications of the Internet (3 credits)
Enterprises thrive on information, and telecommunications is now viewed as an efficient means of disseminating and receiving information. The Internet has emerged as the dominant server for national and international data communications between commercial, government, military, and academic organizations and network hosts. This course will study the structure, organization, and use of the Internet. Internet tools and their potential application are examined including Telnet, anonymous FTP, Usenet News, Finger, Internet Relay Chat, Alex, Archie, Gopher, Hytelnet, Netfind, Prospero, Veronica, WAIS, WHOIS, and WWW. Students will be able to use the UNIX operating system and the Internet to successfully manage the efficient transfer of information to distant clients.

MCIS 660 Systems Analysis and Design (3 credits)
Analysis of requirements for information systems. Elicitation/fact-finding, problem analysis, decomposition, and the requirements document. Concepts, methods, techniques, and tools for systems analysis, modeling and simulation, and prototyping. Structured and object-oriented analysis. Role of the systems analyst in the organization. Gaining user commitment and fulfilling user needs. Concepts, tools, and techniques for systems design. Design principles, quality factors, decomposition of complex systems, and modularization techniques. Design methods such as object-oriented and function-oriented design. Comparison of analysis and design techniques.

MCIS 661 Object-Oriented Applications for CIS (3 credits)
Principles of the object-oriented paradigm. Application of object-oriented methods in computer information systems. Object-oriented languages and design methods for class creation. Study of the use of object-oriented techniques in applications such as user interfaces, graphics, database systems, visual programming, hypermedia, office automation systems, and decision support systems. Techniques for software reuse.

MCIS 670 Artificial Intelligence and Expert Systems (3 credits)
Includes an introduction to artificial intelligence as well as historical and current trends and characterization of knowledge-based systems. Search, logic and deduction, knowledge representation, production systems, and expert systems will be examined. Additional areas include architecture of expert systems and criteria for selecting expert system shells, such as end-user interface, developer interface, system interface, inference engine, knowledge base, and data interface. The student will use a commercial shell to build a working expert system.

MCIS 671 Decision Support Systems (3 credits)
Examines concepts of decision support in both non-automated and automated environments. Emphasis on structures, modeling, and the application of various decision support systems in today's corporate environment. Additional emphasis is placed on the use of executive information and expert system applications. Case studies examine applications of each of these types of technology.

MCIS 672 Computer-Aided Software Engineering (3 credits)
Computer-Aided Software Engineering (CASE) is a technique in which the path between initial systems analysis and the final coding of programs can be at least partly automated. Topics include a critical comparison between CASE and 4GLs (Fourth-Generation Languages), upper CASE (analysis/design), lower CASE (code generation and testing), tool kits, workbenches, methodology companions, platforms, completeness and consistency checking.

MCIS 680 Human-Computer Interaction (3 credits)
Focuses on the dynamics of human-computer interaction (HCI). Provides a broad overview of HCI as a sub-area of computer science and explores user-centered design approaches in information systems applications. Addresses the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests.

MCIS 681 Multimedia and Emerging Technologies (3 credits)
Recent advances in high performance computing and computer networks and their impact on network-based applications and work-group productivity are examined. New developments in optical storage technologies, imaging systems, computer architectures, communications services, and graphical user interfaces are delineated. Trends in the development and the use of multimedia. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia products.

MCIS 682 Information Systems Project (3 credits)
Students are assigned a project that involves part or all of the system development cycle and gain experience in analyzing, designing, implementing, and evaluating information systems. Prerequisite: prior consent of instructor.

MCIS 683 Data Center Management (3 credits)
Examines information center methods for building systems between users and analysts. The traditional life-cycle development will be reviewed. The role and services of the information center will be discussed within the context of these issues: user support, goals in terms of user education and training, promoting systems support and development services, and promulgating and monitoring use of standards for software and for protection of data resources. Other topics in this course include principles of application generators, prototyping, user and provider roles in an information center. Students identify strengths and limitations of the information center approach.

MCIS 691 Special Topics in Information Systems (3 credits)
This seminar will focus on the professor's current research interests. Prerequisite: prior consent of instructor and program director.

Master of Science in Management Information Systems

This program offers a course of study leading to the Master of Science (M.S.) in Management Information Systems. It focuses on the application of information system concepts to the collection, retention, and dissemination of information for management planning and decision-making. The program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. Its formats offer professionals the opportunity to earn the master's degree in 18 months while continuing to work in their current positions.

Admission Requirements

Applicants must meet the specified minimum requirements and file the requested documents:

1. An earned bachelor's degree from a regionally accredited college or university. The program is designed for students with undergraduate majors in management information systems, computer information systems, business administration, or a related field, and having knowledge and experience in computer applications.
2. Official transcripts of all graduate and undergraduate education showing an undergraduate G.P.A. of at least 2.5 and a G.P.A. of 3.0 in a major field.
3. A completed application and application fee.
4. Three letters of recommendation.
5. Score report of the Graduate Record Examination (G.R.E.) or a comprehensive portfolio of appropriate professional experience and credentials.

Program Formats

The 36-semester-hour program, consisting of 12 courses, is designed so that it can be completed in 18 months without interrupting the student's professional career. The program can be taken in the evening on the main campus or in an online format. With permission of the program office, a student in one format may take a course in another format. To complete the program in 18 months, the student must enroll in two courses per term. Terms are 12 weeks in duration, and four terms are offered each year.

A student wishing to take a course as an independent study must first appeal to the program office. If the program office agrees, then it will attempt to obtain the agreement of a faculty member to direct the independent study and will then inform the student of its decision. A student wishing to cross-register for a course in another SCIS master's degree curriculum must obtain the approval of his or her program office.

Formats for this program are described below:

On-Campus Format

This format consists of 8 core courses and 4 electives. Each three-credit course meets for three hours per week for 12 weeks. Courses are held on campus in the evening.

Online Format

This format requires the completion of 12 courses via online techniques. The student participates in a range of activities that facilitate frequent interaction with faculty, classmates, and colleagues: NSU's real-time electronic classroom sessions, online computer discussions and conferences, electronic submission of assignments for review by faculty, electronic mail, interactive bulletin boards, the electronic library and NSU's distance library services. Learning and interaction are facilitated by hypertext menuing systems. The Internet is also used extensively. Costs for online activities are included in the tuition.

The Curriculum for the M. S. in Management Information Systems

Core courses for the on-campus format:

MMIS 611 Computer Structures and Algorithms Using COBOL
MMIS 620 Management Information Systems
MMIS 621 Information Systems Project Management
MMIS 630 Databases in MIS
MMIS 641 Organization of the Computing Environment
MMIS 653 Telecommunications and Computer Networking
MMIS 660 Systems Analysis and Design
MMIS 671 Decision Support Systems

Electives for the on-campus format are listed below. The student can select four of these courses. If the thesis option is elected, then only two of these courses will be required. Plans for the thesis option must be made with the program office.

MMIS 610 Survey of Computer Languages
MMIS 615 Quantitative Methods
MMIS 622 Office Automation Systems
MMIS 623 Legal and Ethical Aspects of Computing
MMIS 624 Computer Integrated Manufacturing
MMIS 625 Computer Graphics for Information Managers
MMIS 626 Application of Microcomputer Systems
MMIS 631 Databases in MIS Practicum
MMIS 632 Distributed Database Management
MMIS 640 System Test and Evaluation
MMIS 652 Computer Security
MMIS 654 Applications of the Internet
MMIS 670 Artificial Intelligence and Expert Systems
MMIS 672 Computer-Aided Software Engineering
MMIS 680 Human-Computer Interaction
MMIS 681 Multimedia and Emerging Technologies
MMIS 683 Data Center Management

The 12 courses for the 18-month online format are listed below. If the thesis option is elected, then two of these courses are not required. Plans for this option must be made with the program office.

MMIS 610 Survey of Computer Languages
MMIS 611 Computer Structures and Algorithms Using COBOL
MMIS 615 Quantitative Methods
MMIS 620 Management Information Systems
MMIS 621 Information Systems Project Management
MMIS 626 Application of Microcomputer Systems
MMIS 630 Databases in MIS
MMIS 641 Organization of the Computing Environment
MMIS 653 Telecommunications and Computer Networking
MMIS 660 Systems Analysis and Design
MMIS 671 Decision Support Systems
MMIS 680 Human-Computer Interaction

Course Descriptions for the M.S. in Management Information Systems

MMIS 610 Survey of Computer Languages (3 credits)
A study of high-level languages, fourth-generation languages, and command languages used in the development of software for management information systems. The logical and physical structure of programs and data. Concepts of structured programming. Data structures, file management, and their use in problem solving. Students will complete a variety of high-level language computer programs.

MMIS 611 Computer Structures and Algorithms Using COBOL (3 credits)
Data and file structure concepts, data record format and file organization, sequential vs. random file access methods, tree-based file structure and search techniques, indexing and data clustering, multiway sort/merge and sort algorithms, input/output blocking and buffering. The student will design and implement programs in COBOL.

MMIS 615 Quantitative Methods (3 credits)
An introduction to the basic quantitative tools needed to support problem solving and decision- making in the information systems environment. Heavy emphasis is placed on the application of these tools in a case-based, real-world environment.

MMIS 620 Management Information Systems (3 credits)
The application of information system concepts to the collection, retention, and dissemination of information for management planning and decision-making. Issues such as personnel selection, budgeting, policy development, and organizational interfacing are discussed. Conceptual foundations and planning and development of management information systems. The role of MIS in an organization and the fit between the system and the organization.

MMIS 621 Information Systems Project Management (3 credits)
Practical examination of how projects can be managed from start to finish. Life-cycle models and paradigms. Life-cycle phases. Project planning and risk analysis. Project control including work breakdown structures, project scheduling, activities and milestones. Software cost estimations techniques/models. Software quality assurance and metrics for software productivity and quality. Inspections, walkthroughs, and reviews. Approaches to team organization. Documentation and configuration management. Automated project management tools. Software maintenance. Procurement of software services and systems.

MMIS 622 Office Automation Systems (3 credits)
This course focuses on strategies for utilizing technology to handle the information used in the office to improve the quantity, content, and format of work performed. Topics include the design and implementation of an office automation system; strategies for successful end-user computing; OA applications including electronic mail and voice mail; windowing; multitasking; computer conferencing; computer supported cooperative work; project management software; and decision support programs. The impact of ISDN on the office environment.

MMIS 623 Legal and Ethical Aspects of Computing (3 credits)
Focuses on issues that involve computer impact and related societal concerns. Topics include transitional data flow; copyright protection; information as a source of economic power; rights to access to computer systems; computer crime; data privacy; establishing national priorities in the technical and social aspects of computing; current and anticipated uses of computer prediction; and protection of personal ethical concerns. National computer policies of Japan, France, Great Britain, and the EEC, and the status of regulation and emerging standards.

MMIS 624 Computer Integrated Manufacturing (3 credits)
Provides a framework for understanding how functional organization structure impacts the design of a management information system in a manufacturing setting. Special emphasis will be on marketing, manufacturing, and financial information systems. Topics covered include the product life cycle; production scheduling and capacity requirements planning; techniques for using MIS in inventory management decisions, quality control, internal accounting, and funds management. Planning strategies for forecasting services, developing requirements and specifications, writing requests for proposals, and project management will be examined within the context of functional information systems.

MMIS 625 Computer Graphics for Information Managers (3 credits)
Presents computer graphics as an aid to information managers who need a clear means of presenting the analysis of information. Topics include basic graphic techniques (e.g. histograms, bar charts, pie charts), the theory of graphic presentation of information, desktop publishing software, presentation software, graphics monitors (EGA, CGA, VGA, RGB, composite), laser printers, computer screen projection systems, and standards.

MMIS 626 Application of Microcomputer Systems (3 credits)
Selection and use of microcomputers, including hardware and software, for management information systems. Distributed microcomputer systems, e.g., the integrated office automation system. E-mail, computer conferencing, voice mail, project management software, imaging systems, and the sharing of databases, spreadsheets, word processing files, etc. Microcomputer networking techniques, security and backup. Multimedia systems.

MMIS 630 Databases in MIS (3 credits)
The application of database concepts to management information systems. Design objectives, methods, costs, and benefits associated with the use of a database management system. Tools and techniques for the management of large amounts of data. Database design, performance and administration. File organization and access methods. The architectures of database systems, data models for database systems (network, hierarchical, relational and object-oriented model), client/server database applications, distributed databases, and object-oriented databases.

MMIS 631 Databases in MIS Practicum (3 credits)
The techniques of database management systems will be applied to practical projects. Prerequisite: MMIS 630.

MMIS 632 Distributed Database Management (3 credits)
Students will study information storage and retrieval in a distributed environment. Topics include distributed processing networks; degrees of distribution; approaches to distribution – multiple unduplicated/duplicated and centralization/decentralization issues; management concerns and criteria; and technical developments in office systems (digital voice communications, LANS, electronic mail, decision support systems, etc.), and alternatives for distributed processing. Prerequisite: MMIS 630.

MMIS 640 System Test and Evaluation (3 credits)
An analysis of the verification and validation process. Methods, procedures, and techniques for integration and acceptance testing. Reliability measurement. Goals for testing. Testing in the small and testing in the large. Allocation of testing resources. When to stop testing. Test case design methods. Black box software testing techniques including equivalence partitioning, boundary-value analysis, cause-effect graphing, and error guessing. White box software testing techniques including statement coverage criterion, edge coverage criterion, condition coverage criterion, and path coverage criterion. Test of concurrent and real-time systems.

MMIS 641 Organization of the Computing Environment (3 credits)
This course focuses on technology and management topics related to the modern information systems environment. The importance of information systems infrastructure including hardware and software selection and computing systems elements' configuration and integration are discussed. Critical factors on organizational interfacing and optimal approaches for the system development are evaluated. Special attention is given to the role of tactical and strategic planning using information systems technology.

MMIS 652 Computer Security (3 credits)
Provides a foundation for understanding computer and communications security issues and a framework for creating and implementing a viable security program. Topics include hardware, software, and network security; the regulatory environment; personnel considerations; cryptography; protective controls against potential threats including hackers, disgruntled insiders, and software viruses; and techniques for responding to security breaches.

MMIS 653 Telecommunications and Computer Networking (3 credits)
The role of telecommunications and computer networks in management information systems. Technical fundamentals and design of telecommunications and computer networks. Strategies, tools, and techniques for network planning, implementation, management, maintenance, and security. Topics include ISDN and B-ISDN, the OSI Model, transmission media, network operating systems, topologies, configurations, protocols, and performance characteristics. Trends in standardization, internetworking, downsizing, and the development of local area networks (LANs), wide area networks (WANs), metropolitan area networks (MANs), and enterprise-wide networks are examined.

MMIS 654 Applications of the Internet (3 credits)
Enterprises thrive on information, and telecommunications is now viewed as an efficient means of disseminating and receiving information. The Internet has emerged as the dominant server for national and international data communications between commercial, government, military, and academic organizations and network hosts. This course will study the structure, organization, and use of the Internet. Internet tools and their potential application are examined including Telnet, anonymous FTP, Usenet News, Finger, Internet Relay Chat, Alex, Archie, Gopher, Hytelnet, Netfind, Prospero, Veronica, WAIS, WHOIS, and WWW. Students will be able to used the UNIX operating system and the Internet to successfully manage the efficient transfer of information to distant clients.

MMIS 660 Systems Analysis and Design (3 credits)
Analysis of requirements for information systems. Elicitation/fact-finding, problem analysis, decomposition, and the requirements document. Concepts, methods, techniques, and tools for systems analysis, modeling and simulation, and prototyping. Structured and object-oriented analysis. Role of the systems analyst in the organization. Gaining user commitment and fulfilling user needs. Concepts, tools, and techniques for systems design. Design principles, quality factors, decomposition of complex systems, and modularization techniques. Design methods such as object-oriented and function-oriented design. Comparison of analysis and design techniques.

MMIS 670 Artificial Intelligence and Expert Systems (3 credits)
This course will include an introduction to artificial intelligence as well as historical and current trends and characterization of knowledge-based systems. Search, logic and deduction, knowledge representation, production systems, and expert systems will be examined. Additional areas include architecture of expert systems and criteria for selecting expert system shells, such as end-user interface, developer interface, system interface, inference engine, knowledge base, and data interface. The student will use a commercial shell to build a working expert system.

MMIS 671 Decision Support Systems (3 credits)
Examines concepts of decision support in both non-automated and automated environments. Emphasis will be placed on structures, modeling, and the application of various decision support systems in today's corporate environment. Additional emphasis will be placed on the use of executive information and expert system applications. Case studies will be used to look at existent applications of each of these types of technology.

MMIS 672 Computer-Aided Software Engineering (3 credits)
Computer-Aided Software Engineering (CASE) is a technique in which the path between initial systems analysis and the final coding of programs can be at least partly automated. Topics include a critical comparison between CASE and 4GLs (Fourth-Generation Languages), upper CASE (analysis/design), lower CASE (code generation and testing), tool kits, workbenches, methodology companions, platforms, completeness and consistency checking.

MMIS 680 Human-Computer Interaction (3 credits)
The dynamics of human-computer interaction (HCI). Provides a broad overview and offers specific background relating to user-centered design approaches in information systems applications. Areas to be addressed include the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests.

MMIS 681 Multimedia and Emerging Technologies (3 credits)
Recent advances in high performance computing and computer networks and their impact on network-based applications and work-group productivity are examined. New developments in optical storage technologies, imaging systems, computer architectures, communications services, and graphical user interfaces are delineated. Trends in the development and the use of multimedia. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia products.

MMIS 683 Data Center Management (3 credits)
Information center methods for building systems. The traditional life-cycle development will be reviewed. The role and services of the information center will be discussed within the context of these issues: user support, goals in terms of user education and training, promoting systems support and development services, and promulgating and monitoring use of standards for software and for protection of data resources. Other topics include principles of application generators, prototyping, user and provider roles in an information center. Students will learn to identify strengths and limitations of the information center approach.

Faculty and Staff of The School of Computer and Information Sciences

The Faculty

Gertrude W. Abramson, Ed.D., Columbia University. Professor. Computer education, hypermedia/ multimedia, authoring systems, courseware design, distance learning.

Phillip M. Adams, Ph.D., Nova Southeastern University. Professor. Compilers, artificial intelligence, expert systems, operating systems, systems software, computer architecture.

Harvey M. Deitel, Ph.D., Boston University. Professor. Operating systems, emerging technologies, software engineering, object-orientation.

Laurie P. Dringus, Ph.D., Nova Southeastern University. Assistant Professor. Human–computer interaction, group support systems, learning theory, distance education.

George K. Fornshell, Ph.D., Nova Southeastern University. Associate Professor. Instructional systems development, multimedia, authoring systems, human factors, distance education.

Rollins Guild, Ph.D., Nova Southeastern University. Assistant Professor. Mathematical modeling, computer graphics, programming languages, artificial intelligence.

Margaret Hutto, M.A., Columbia University; M.S. Pace University. Instructor. Structured programming, artificial intelligence, Cobol, modeling and simulation.

John Kingsbury, Ph.D., Florida State University. Assistant Professor. Learning theory, management/ technology/organizational change, ethics, human resource information systems, strategic planning.

Michael J. Laszlo, Ph.D., Princeton University. Associate Professor. Data structures and algorithms, software engineering, programming, computer graphics.

Jacques Levin, Ph.D., University of Grenoble. Professor. Database management, modeling, distance education, decision support systems, numerical analysis.

Edward Lieblein, Ph.D., University of Pennsylvania. Professor and Dean. Software engineering, object-oriented design, programming languages, automata theory.

Marlyn Kemper Littman, Ph.D., Nova Southeastern University. Professor. Computer networks, broadband communications, multimedia, telecommunications, emerging technologies.

Frank Mitropoulos, M.S., Nova Southeastern University. Instructor. Programming languages, data structures, software engineering, object-oriented design, C, C++.

Raul Salazar, Ph.D., Nova Southeastern University. Assistant Professor. Multimedia, computer networks, programming languages, computer systems, computer graphics.

John Scigliano, Ed.D., University of Florida. Professor. Online information systems, information systems management, distance education.

Junping Sun, Ph. D., Wayne State University. Assistant Professor. Database management systems, object-oriented database systems, artificial neural networks.

Raisa Szabo, M.S., Budapest Technical Institute. Instructor. Computer architecture, artificial intelligence and neural networks, robotics and automated systems, operations research, concurrent languages.

Steven R. Terrell, Ed.D., Florida International University. Associate Professor. Research methodology and statistics, learning theory, distance education, computer-managed instruction.

The Administrative Staff

Beverly Bentley, Administrative Assistant. Undergraduate and Master's Programs.

Jan Bourne, Advisor, Undergraduate and Master's Programs.

Bonnie C. Bowers, Assistant to the Dean and SCIS Operations Manager.

Barbara J. Edge, Assistant Director, CS/CIS Doctoral Programs; SCIS Budget Manager.

George Gabb, Director, Undergraduate Programs and Assistant Director, Master's Programs.

Elizabeth Gawelek, Program Representative.

Linda P. Gordon, Admissions Coordinator.

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Janet King-Henry, Coordinator, Online Doctoral Programs.

Rose Lemos, Program Representative.

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Bellarmin Selvaraj, Director, Research and Evaluation.

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Elizabeth Vayda, Coordinator, CS/CIS Doctoral Programs and SCIS Budgets.

Sheree-Ann Wheatle, Coordinator, Marketing.